

CORRESPONDENCE.

THE CARRARA MARBLE DISTRICT (APUAN ALPS).

SIR,—In reply to Professor Bonney's remarks on p. 47 of the *GEOLOGICAL MAGAZINE* of January, suffice it to point out (1) that the determination of the age of the crystalline schists and of the marble beds is essentially a question of palæontological and stratigraphical evidence, which, as I have shown, is absolutely conclusive, and is, moreover, universally accepted; (2) that it was neither the object nor within the available space of my paper to enter into the details of microscopical examination, the less so as this part of the subject has been exhaustively dealt with in the recent memoirs of Professor d'Achiardi, of Pisa, and of Mattiolo and Franchi of the Italian Geological Survey; (3) that the district of the Apuan Alps is pre-eminently one which, owing to its extent and complexity, requires long and patient study of the entire area, and cannot be mastered by two admittedly incomplete visits, of only a few hours each, barely beyond one point of its periphery.

C. DU RICHE PRELLER.

EDINBURGH.

January 12, 1916.

THE CRYSTALLINE ROCKS OF THE PIEMONTESE ALPS.

SIR,—In a footnote (p. 16) of my paper on the Permian formation of the Maritime and Western Alps in the *GEOLOGICAL MAGAZINE* of January, I mentioned that I propose to deal in a subsequent paper more fully with the crystalline schists and the pietre verdi areas, also in relation to the anti-Archæan and pro-Mesozoic views of Franchi as opposed to those of Zaccagna. In the meantime I should perhaps mention that in the most recent Italian geological maps just come to my notice the extensive crystalline calc-schist formation, which up to 1909 figured as pre-Palæozoic, has been rejuvenated to Mesozoic.

C. DU RICHE PRELLER.

EDINBURGH.

January 12, 1916.

OBITUARY.

ARTHUR VAUGHAN,

B.A. (Cant.), M.A. (Oxon.), D.Sc. (Lond.).

BORN MARCH, 1868.

DIED DECEMBER 3, 1915.

(WITH A PORTRAIT, PLATE V.)

THE death at the early age of 47 of Dr. Arthur Vaughan, which took place at Oxford on December 3, removes one of the most brilliant of British stratigraphical geologists.

Dr. Vaughan was the son of the late William Vaughan, F.I.A., Actuary to the Board of Trade, and was born in London in 1868. After a highly successful career at University College School, he entered University College, London, in 1885, and there acquired his first interest in geology from the influence of Professor Bonney. In 1887 he entered Trinity College, Cambridge, with an open scholarship,



ARTHUR VAUGHAN,
B.A.(CANT.), M.A.(OXON.), D.Sc.(LOND.).

1868-1915

and in his first year obtained a major mathematical scholarship. He was third Wrangler in 1890, and in 1891 obtained a First Class in mathematical physics in Part II of the Mathematical Tripos. He also obtained 1st class Honours in Mathematics in the London B.Sc. examination. These academic successes, brilliant though they were, were not considered by his teachers to do full justice to his ability.

On leaving Cambridge in 1891 he accepted a post as Senior Science Master at an Army coaching establishment at Clifton, and remained there till 1910.

His earliest papers were on mathematical physics and dealt with the earth's crust, but shortly after settling at Clifton he became acquainted with Edward Wilson, then the Curator of the Bristol Museum, and to Wilson's influence the definitely geological bent of Vaughan's main work may in a great measure be attributed. Wilson was principally interested in the Jurassic rocks, and it was to these that Vaughan first turned his attention, his earliest geological paper, "The Lower Lias of Keynsham" (1902), being written in collaboration with Mr. J. W. Tutchet.

During the years 1900 and 1901 he was engaged in the study of the splendid series of sections exposed in constructing the South Wales direct line between Filton and Wootton Bassett. The strata exposed range from the Old Red Sandstone to the Kimmeridge Clay, and include a fine section of Carboniferous Limestone. It was the study of these latter rocks which induced Vaughan to re-examine the Avon section, and led to the work with which his name will always be associated. His paper on the Carboniferous Limestone of the Bristol Area, which was published in 1905, has already become a geological classic, and as regards the wide applicability of the results, and the stimulating effect upon other workers, it may confidently be claimed that no more important piece of palæontological stratigraphy has been carried out since Lapworth's work on the Lower Palæozoic rocks.

Vaughan's results at once began to be applied by keen workers in numerous parts of the British Isles, and he himself described the Rush (1906) and Loughshinny (1908) sections in collaboration with Dr. Matley, and that of Gower (1911) with Mr. (now Lieutenant) E. L. Dixon. The above papers are principally concerned with the zonal succession of the Lower Carboniferous rocks, but deal also with the mutations of Carboniferous Corals and Brachiopods, a subject in which Vaughan quickly became deeply interested. His views on the lines of development in the case of Corals are set forth in a paper on the Avonian of Burrington Combe (1911).

The rapid growth of interest in the Carboniferous Limestone led to many problems being submitted to him, and instead of spending his spare time in healthy field work he came to be more and more confined to indoor work, which was carried out under none too favourable conditions. He was a man who never spared himself, and it is to be feared that out of the kindness of his heart he undertook much identification with which he really ought never to have been troubled. The duties of an Army tutor are also of a very exacting character, and all this hard work began about 1908 seriously to affect his health.

In 1905 he became Secretary of the British Association Committee for the investigation of life-zones in the British Carboniferous rocks, and drew up a series of important reports. Particular attention may be directed to those of Winnipeg (1909), Sheffield (1910), and Manchester (1915). In the Winnipeg report he correlated the Carboniferous Limestone (Avonian) succession in various parts of the British Isles, and threw much light on the phasal equivalents, while that at Manchester, his last piece of work, is concerned with the shifting of the western shore-line in England and Wales during the Avonian period. The Sheffield report (1910) correlates the British and Belgian succession, and was the result of a visit paid to Belgium in the summer of 1909. Vaughan paid a second visit to Belgium in 1912, this time in company with a party of British geologists, and had the satisfaction of completing his Belgian work in a paper published in the Geological Society's journal last year. The importance of this work was quickly recognized by Belgian geologists, and he was elected a Foreign Member of the Geological Society of Belgium. He received the Wollaston Fund from the Geological Society in 1907 and the Lyell Medal in 1910.

In 1910 Vaughan moved to Oxford, having accepted a post as Lecturer on Geology in the University, and the charm of his personality and his marked ability as a teacher made him very popular with his students. While at Oxford his attention was particularly directed to questions bearing on the evolution of animal life, and breaking new ground he devoted much time to the study of fossil ungulates. He was also engaged on a textbook of palæontology written on somewhat novel lines, for the illustration of which Mr. Tatcher had prepared several hundred photographs. Although this is left unfinished, there is hope that it may prove possible to publish it.

Though his lighter duties at Oxford caused some improvement in Vaughan's health, it was still the cause of much anxiety to his friends. In 1914 he visited Australia with the British Association, and was able to satisfy himself that the remarkable Permian-Carboniferous strata were correctly correlated with the Artinskian of Russia. He hoped to have the opportunity of visiting Russia for the examination of these strata, and with his usual thoroughness occupied himself during the last years of his life with the study of Russian.

Probably the characteristics which impressed themselves most on the many friends who mourn his early death were his geniality and loyalty, the courage with which he stuck to his work through long years of failing health, and the remarkable grip and clear-sighted logical analysis with which he tackled any problem.

S. H. R.

LIST OF PAPERS BY ARTHUR VAUGHAN.

- "Stress within a Sphere due to inequalities at its surface, with application to the Earth": 1897, privately printed, Taylor & Francis.
- "The Corrugation of the Earth's Surface and Volcanic Phenomena": *GEOL. MAG.*, Dec. IV, Vol. I, pp. 263-70, 1894.

- “Remarks on Mr. Mellard Reade’s Article ‘On the Results of Unsymmetrical Cooling and Redistribution of Temperature in a Shrinking Globe as applied to the Origin of Mountain Ranges’”: *ibid.*, p. 312.
- “Problems connected with a Cooling Earth”: *ibid.*, p. 505.
- “The Making of Mountains: A Reply to Mr. Mellard Reade”: *ibid.*, Vol. II, pp. 93–6, 1895.
- “The Argument for Solidarity drawn from Ocean Tides”: *Proc. Bristol Nat. Soc.*, ser. III, vol. viii, pp. 269–73, 1899.
- “Notes on the Corals and Brachiopods obtained from the Avon Section and preserved in the Stoddart Collection”: *ibid.*, vol. x, pp. 90–134, pls. i–ii, 1903.
- “The Lowest Beds of the Lower Lias at Sedbury Cliff”: *Abs. Proc. Geol. Soc.* 1902–3, p. 124; and *Q.J.G.S.*, vol. lix, pp. 396–402, 1903.
- “The Palæontological Sequence in the Carboniferous Limestone of the Bristol Area”: *Abs. Proc. Geol. Soc.* 1903–4, pp. 100–1, 1904; and *Q.J.G.S.*, vol. lxi, pp. 181–305, figs., pls. xxii–ix, 1904.
- “Note on the Lower Culm of North Devon”: *GEOL. MAG.*, Dec. V, Vol. I, pp. 530–2, 1904.
- “Note on the Brachiopods and Corals collected by Dr. Brendon Gubbin from the Carboniferous Limestone of South-West Gower, and the Zones which they indicate”: *Proc. Bristol Nat. Soc.*, ser. IV, vol. i, pp. 53–6, 1905.
- “The Carboniferous Limestone Series (Avonian) of the Avon Gorge”: *Proc. Bristol Nat. Soc.*, ser. IV, vol. i, pp. 74–168, figs., pls. i–xvi, 1906.
- Note on Corals in Report of the Committee on Life-Zones in the British Carboniferous Rocks: *Rep. Brit. Assoc.* 1906, pp. 309–11, 1907.
- “A Note on *Seminula*”: *Ann. Mag. Nat. Hist.*, ser. VII, vol. xix, pp. 194–8, 1907.
- “Note on the Coral-Zones of the Avonian (Lower Carboniferous)”: *Proc. Geol. Assoc.*, vol. xx, pp. 70–3, 1907.
- “A Note on the Carboniferous Sequence in the Neighbourhood of Pateley Bridge”: *Proc. Yorks Geol. Soc.*, vol. xvi, pp. 75–83, 1907.
- “Faunal Succession in the Carboniferous Limestone (Avonian) of the British Isles”: *Rep. Brit. Assoc.*, vol. lxxviii, Dublin, 1908, pp. 267–9, 1909; vol. lxxix, Winnipeg, 1909, pp. 187–91, 1 pl., 1910; vol. lxxx, Sheffield, 1910, pp. 106–10, fig., 1911.
- “Note on *Clisiophyllum ingletonense*, sp. nov.”: *Proc. Yorks Geol. Soc.*, N.S., vol. xvii, pp. 251–5, pl. xxxviii, 1912.
- “Correlation of Dinantian and Avonian”: *Q.J.G.S.*, vol. lxxi, pp. 1–52, pls. i–vii, 1915.
- “The Reef Knolls of Clitheroe, Bowland, and Craven” (read at the Yorkshire Geological Society, Leeds, June 24, 1915); to be published in the *Proceedings of the Yorkshire Geol. Soc.* now in the press.
- “Shift of the Western Shore-line in England and Wales during the Avonian Period” (read at the British Association Meeting, Manchester, 1915).
- With E. E. L. DIXON. “The Carboniferous Succession in Gower (Glamorganshire), with Notes on its Fauna and Conditions of Deposition”: *Abs. Proc. Geol. Soc.* 1909–10, pp. 72–3, 1910; and *Q.J.G.S.*, vol. lxvii, pp. 477–567, figs. [geol. map], pls. xxxviii–xl, 1911.
- With C. A. MATLEY. “An Account of the Faunal Succession and Correlation [of the Carboniferous Rocks of Rush (Co. Dublin)]”: *Q.J.G.S.*, vol. lxii, pp. 295–322, pls. xxix–xxx, 1906.
- “The Faunal Succession in the Carboniferous Limestone of the South-West of England and Ireland: Interim Report”: *GEOL. MAG.*, Dec. V, Vol. IV, pp. 466–8, 1906; and *Rep. Brit. Assoc. Adv. Sci.* 1906, York, pp. 292–3, 1907.
- “The Carboniferous Rocks at Loughshinny (Co. Dublin)”: *Q.J.G.S.*, vol. lxiv, pp. 413–74, pls. xlix–l, 1908.
- With S. H. REYNOLDS. “On the Jurassic Strata cut through by the South Wales Direct Line between Filton and Wootton Bassett, Wilts”: *Abs. Proc. Geol. Soc.* 1901–2, pp. 132–3, 1902; and *Q.J.G.S.*, vol. lviii, pp. 719–52, figs., 1902.

- With S. H. REYNOLDS. "The Rhætic Beds of the South Wales Direct Line": *ibid.*, 1903-5, pp. 41-2; and Q.J.G.S., vol. lx, pp. 194-213, figs., pl. xviii, 1904.
- "Faunal and Lithological Sequence in the Carboniferous Limestone Series (Avonian) of Burrington Combe (Somerset)": *ibid.*, 1910-11, pp. 94-5; and Q.J.G.S., vol. lxvii, pp. 342-92, figs. [plan], pls. xxviii-xxxi, 1911.
- With J. W. TUTCHER. "The Lower Lias of Keynsham": *Proc. Bristol Nat. Soc.*, ser. III, vol. x, pp. 1-55, figs., 1903.
- With T. W. VAUGHAN. "Notice of H. M. Bernard's Work on the Poritid Corals (Recent and Fossil)": *Science*, N.S., vol. xxvi, pp. 373-8, 1907.
- With others. Excursion to Bristol: *Proc. Geol. Assoc.*, vol. xx, pp. 150-6, pl. iv, 1907.
- Report [as Secretary] of the Committee on the Faunal Succession in the Carboniferous Limestone of the South-West of England: *Rep. Brit. Assoc.*, 1906-10.

PROFESSOR DR. J. C. MOBERG,

Lund University, Sweden.

WE regret to learn of the death of Dr. Johan Christian Moberg, Professor of Geology at Lund University and Member of the K. Svenska Vetenskaps-Akademi, which took place at Lund on December 30, 1915. Professor Moberg was well known as a worker in the Palæozoic Geology and Palæontology of Sweden, especially of Scania, and produced a valuable summary of the subject for the use of the Geological Congress when it met at Stockholm. He was in his sixty-second year.

WILLIAM RUPERT JONES.

BORN 1855.

DIED DECEMBER 17, 1915.

THE death is announced of the late Assistant Librarian to the Geological Society of London at the age of 60. Mr. William Rupert Jones was the son of the well-known geologist Professor Thomas Rupert Jones, F.R.S., for many years himself Assistant Secretary to the Society. He was appointed Assistant Librarian in 1872, and retired on pension in 1912, having served the Society for forty years.

Mr. Jones acquired during his long service an extensive general knowledge of geological and other literature, and aided by a remarkable memory he was able rapidly to assist authors and inquirers to references in almost any line they chanced to pursue.

For many years his Catalogue of Geological Literature, although confined to that received by the Society itself, was the standard book of reference, from its simplicity and general correctness. And there are many authors who had occasion to appreciate his skill in the production of coloured diagrams to illustrate their papers, a labour which grew up gradually but quite unofficially.

Mr. Jones, who leaves no issue, was buried in Brompton Cemetery.

ERRATUM.—In the GEOLOGICAL MAGAZINE for January, 1916, p. 39, 7th line from foot of page, for "repeated *substances* have taken place" read "repeated *subsidences* have taken place".—ED. GEOL. MAG.